

Trend Study 17-40-97

Study site name: Long Hollow .

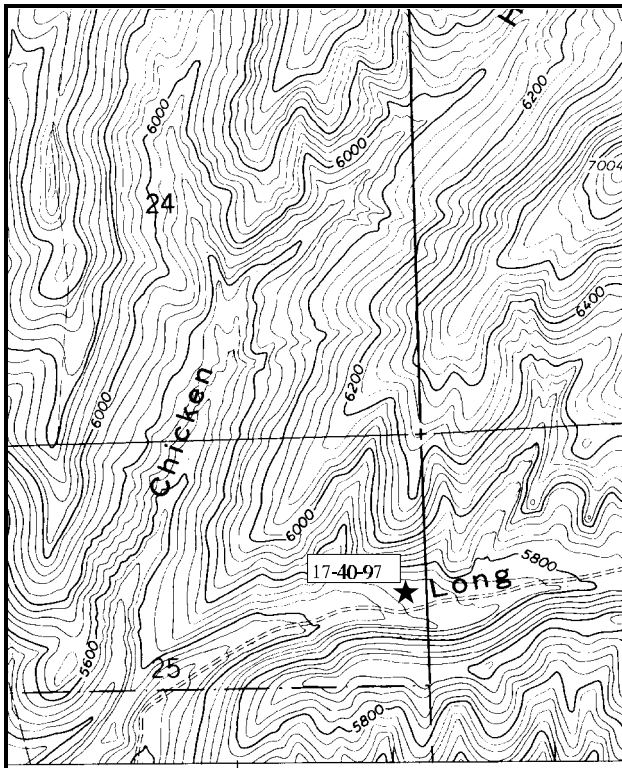
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 354 M degrees. (Line 3-4 71°M)

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

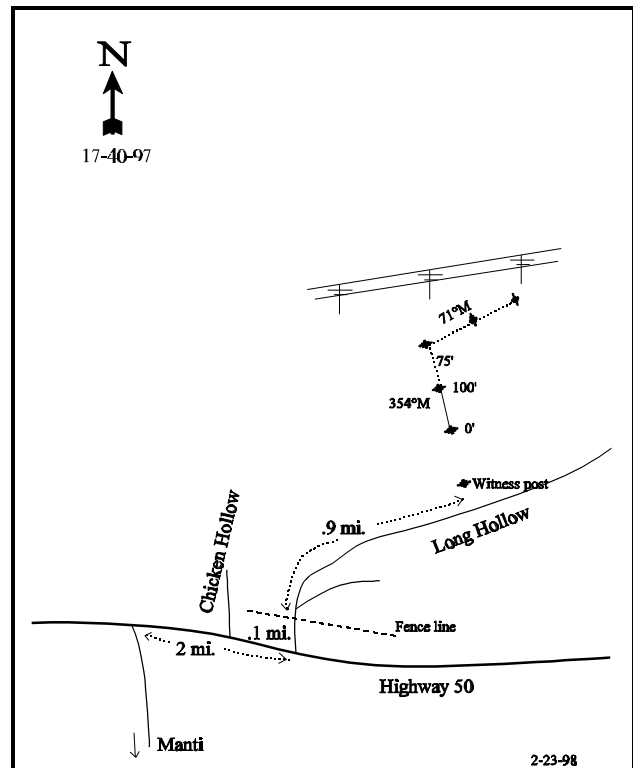
LOCATION DESCRIPTION

Beginning at the intersection of Highway 50 and Long Hollow Road, proceed northerly up Long Hollow for 0.10 miles to a fork. Stay to the left at the fork and proceed an additional 0.90 miles up Long Hollow, to a green steel "T" fencepost on the left side of the road. From the stake, the O-foot marker of the baseline is 15 feet to the north, near a juniper. The study is marked by green steel "T" fenceposts approximately 12 to 18 inches in height. A red browse tag, number 3946, is attached to the O-foot baseline stake. High tension powerlines run above the study sight.



Map Name: Billies Mountain, Utah .

Township 9 S , Range 5 E , Section 30



Diagrammatic Sketch

UTM 4428137.048 N, 436903.887 E

DISCUSSION

Trend Study No. 17-40 (27-14)

The Long Hollow study samples critical deer and elk winter range located in Long Hollow, a rather narrow canyon draining directly into the Spanish Fork River. The study is located close to the valley floor on a gentle (5-10%) south slope with an elevation of 5,760 feet. The range type is sagebrush-grass which has been impacted by activities associated with power line construction. Animal use was initially determined as heavy from deer and elk. Cattle and sheep use was reported moderate in the past, but there was no evidence of use in 1997. Long Hollow is obviously an important wintering area for big game as evidenced by the number of pellet groups. Pellet-group quadrat frequency was moderately high for elk (63%) and moderate for deer (32%). Three winter-killed deer carcasses were found on the site in 1983.

Soil is alluvially and colluvially deposited from the surrounding "North Horn" formation, a coarse and well-drained conglomerate. Numerous variable sized cobblestones are distributed throughout the soil profile and on the surface. Soil textural analysis indicates a sandy clay loam with a neutral pH (7.2). Effective rooting depth (see methods) is almost 13 inches with a soil temperature of about 50°F at 14 inches. Vegetative and litter cover are adequate to prevent serious erosion. Percent bare soil accounts for only 2% of the basic ground cover in 1997.

The dominant overstory is a mixed population of basin big sagebrush and mountain big sagebrush, with the latter being the most prevalent. In 1997, the basin big sagebrush and mountain big sagebrush were reported and classified separately in the tables. These were separated by morphological characteristics. As a result, the level of hedging between individual shrubs varies greatly. Also, the new methodology used to estimate density in 1997 shows a reduced combined density of 1,320 plants/acre. Mountain big sagebrush shows light to moderate hedging with all showing good vigor. These plants are not as large as the basin big sagebrush, measuring 26 inches in height and 42 inches in width. Mountain big sagebrush show fairly good biotic potential in 1997 with several seedlings and young plants classified. Basin big sagebrush averages 34 inches in height and 42 inches in width. These plants show little utilization with a slightly higher rate of decadency than mountain big sagebrush. This would be expected with the moderately shallow soils and a species that requires deeper soils to tolerate the long drought we experienced throughout the state (1986-95). Biotic potential for basin big sagebrush was 9%, like that of mountain big sagebrush. Invader and increaser shrubs are also prominent. The past disturbance associated with power line construction and grazing has resulted in substantial populations of broom snakeweed and pricklypear cactus. The white rubber rabbitbrush shows utilization with an estimated density of 3,020 plants/acre. Broom snakeweed density is estimated at 3,840 plants/acre. Other browse includes fourwing saltbush, and stickleaf low rabbitbrush.

Grass composition consists chiefly of cheatgrass and bulbous bluegrass, which together currently provides 72% of the grass cover. Bulbous bluegrass, while scarcely present in 1983, has significantly increased in nested frequency and now provides the bulk of the grass cover. Some seeded grasses remain in the community and include intermediate wheatgrass and crested wheatgrass. Bluebunch wheatgrass nested frequency has slowly increased over all years with a significant increase from 1983 to 1997, but still only contributes only 5% of the grass cover. Sand dropseed nested frequency has remained relatively stable over all years. Other important grasses include bottlebrush squirreltail, Indian ricegrass, bluegrasses, and an occasional patch of Great Basin wildrye.

Forb composition has changed little through the years and is dominated by invaders and increasers. These include stickseed, scarlet globemallow, pale alyssum, storksbill, and white top. Forage value and productivity of the forb component is poor even though it provides 31% of the herbaceous cover.

1983 APPARENT TREND ASSESSMENT

Soil trend is stable or even improving. The extremely rocky and permeable nature of this soil, along with improving shrub cover, limits erosion. Deposition of rocks and soil particles from the upper slopes probably exceeds the erosion rate. The most obvious vegetative trend is a thickening stand of sagebrush which will become increasingly dominated by basin big sagebrush. Differential grazing pressure is allowing it to reproduce faster than mountain big sagebrush. Other shrub species are present but increasing at a slower rate than basin big sagebrush. Grass and forb cover, as well as composition, are fair to poor and relatively stable.

1989 TREND ASSESSMENT

Although extremely rocky and subject to alluvial deposition, the soil on the site has a stable trend. Due to the amount of combined cover (28% rock and pavement cover), there is little bare soil and the overall ground cover is almost unchanged since 1983. Sagebrush shows good recruitment and the age class structure indicates an expanding population. The forbs provide a fairly diverse understory and valuable spring forage for big game. The vegetative trend also appears stable.

1997 TREND ASSESSMENT

Percent bare soil has declined steadily since 1983 to a little less than 2%. At the same time, rock and pavement cover are declining. Vegetation and litter cover are abundant and will prevent serious erosion. Browse trend is stable. Density appears to be lower than reported in the past, but this is a more accurate estimate of the population with a much larger sample size being used. The relatively small number of dead plants cannot explain these estimate losses. Mountain big sagebrush is more highly preferred than basin big sagebrush, therefore it exhibits more utilization. Broom snakeweed and white rubber rabbitbrush have the highest densities at this time. Herbaceous understory trend is up. Nested frequency for grasses has nearly doubled since 1989, with a significant increase in bulbous bluegrass, intermediate wheatgrass, and Kentucky bluegrass. Forb composition is unchanged.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - up, but poor composition, dominated by bulbous bluegrass and cheatgrass

HERBACEOUS TRENDS --

Herd unit 17 , Study no: 40

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '97
		'83	'89	'97	'83	'89	'97	
G	Agropyron cristatum	a ²⁷	b ⁵⁰	a ²⁶	12	20	9	2.00
G	Agropyron intermedium	a ⁻	a ⁻	b ³⁶	-	-	11	2.80
G	Agropyron spicatum	a ¹⁸	ab ²¹	b ³⁵	6	9	13	1.68
G	Bromus tectorum (a)	-	-	285	-	-	86	7.91
G	Festuca spp.	a ⁻	a ⁻	b ¹²	-	-	4	.02
G	Oryzopsis hymenoides	-	3	-	-	1	-	-
G	Poa bulbosa	a ⁶	a ¹⁶	b ²²⁹	2	8	66	14.18

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '97
		'83	'89	'97	'83	'89	'97	
G	<i>Poa pratensis</i>	_a 1	_a 2	_b 16	1	1	7	.25
G	<i>Poa secunda</i>	_a 1	_b 40	_a 6	1	16	2	.01
G	<i>Sitanion hystrix</i>	3	8	-	2	3	-	-
G	<i>Sporobolus cryptandrus</i>	76	91	67	32	36	29	1.89
Total for Grasses		132	231	712	56	94	227	30.79
F	<i>Alyssum alyssoides</i> (a)	-	-	69	-	-	29	.22
F	<i>Allium</i> spp.	_a -	_a -	_b 11	-	-	6	.03
F	<i>Arabis</i> spp.	-	1	-	-	1	-	-
F	<i>Artemisia dracunculus</i>	7	5	3	4	2	1	.00
F	<i>Artemisia ludoviciana</i>	_a 101	_b 140	_a 86	39	55	38	2.83
F	<i>Aster</i> spp.	-	8	-	-	2	-	-
F	<i>Astragalus</i> spp.	-	-	4	-	-	2	.01
F	<i>Astragalus utahensis</i>	4	6	3	1	3	1	.15
F	<i>Cardaria draba</i>	-	-	24	-	-	7	2.36
F	<i>Calochortus nuttallii</i>	_{ab} 10	_a 1	_b 18	6	1	9	.06
F	<i>Castilleja</i> spp.	-	-	1	-	-	1	.03
F	<i>Cirsium</i> spp.	14	26	10	7	12	5	.46
F	<i>Cymopterus</i> spp.	-	-	2	-	-	1	.00
F	<i>Cynoglossum officinale</i>	-	-	1	-	-	1	.15
F	<i>Draba</i> spp. (a)	-	-	2	-	-	1	.00
F	<i>Epilobium paniculatum</i> (a)	-	-	1	-	-	1	.00
F	<i>Erodium cicutarium</i> (a)	-	-	64	-	-	24	.63
F	<i>Erigeron divergens</i>	_a -	_a -	_b 16	-	-	7	.37
F	<i>Eriogonum racemosum</i>	3	5	2	3	3	1	.03
F	<i>Hackelia patens</i>	_a 20	_b 51	_c 105	9	27	49	2.51
F	<i>Helianthus annuus</i> (a)	_a -	_b 26	_a 2	-	16	1	.00
F	<i>Lactuca pulchella</i>	_b 50	_a 8	_a 20	24	4	9	.07
F	<i>Lithospermum ruderales</i>	-	4	-	-	3	-	.03
F	<i>Medicago sativa</i>	-	-	2	-	-	1	.45
F	<i>Oenothera</i> spp.	-	-	-	-	-	-	.00
F	<i>Phlox longifolia</i>	_a -	_b 15	_b 9	-	9	4	.02
F	<i>Polygonum douglasii</i> (a)	-	-	9	-	-	3	.01
F	<i>Ranunculus testiculatus</i> (a)	-	-	5	-	-	2	.03

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '97
		'83	'89	'97	'83	'89	'97	
F	<i>Sisymbrium altissimum</i> (a)	-	-	3	-	-	1	.03
F	<i>Solidago</i> spp.	_b 16	_a -	_a -	5	-	-	-
F	<i>Sphaeralcea coccinea</i>	_a 44	_a 69	_b 106	19	30	41	3.06
F	<i>Tragopogon dubius</i>	_c 68	_a 1	_b 40	38	1	18	.36
F	<i>Zigadenus paniculatus</i>	1	-	-	1	-	-	-
Total for Forbs		338	366	618	156	169	264	14.00

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 17 , Study no: 40

Type	Species	Strip Frequency '97	Average Cover % '97
B	<i>Artemisia tridentata</i> <i>tridentata</i>	15	3.11
B	<i>Artemisia tridentata</i> <i>vaseyana</i>	25	4.18
B	<i>Atriplex canescens</i>	7	.19
B	<i>Chrysothamnus nauseosus</i> <i>albicaulis</i>	30	3.86
B	<i>Chrysothamnus viscidiflorus</i> <i>viscidiflorus</i>	1	-
B	<i>Gutierrezia sarothrae</i>	45	.97
B	<i>Juniperus osteosperma</i>	0	1.00
B	<i>Opuntia</i> spp.	6	.04
Total for Browse		129	13.37

BASIC COVER --

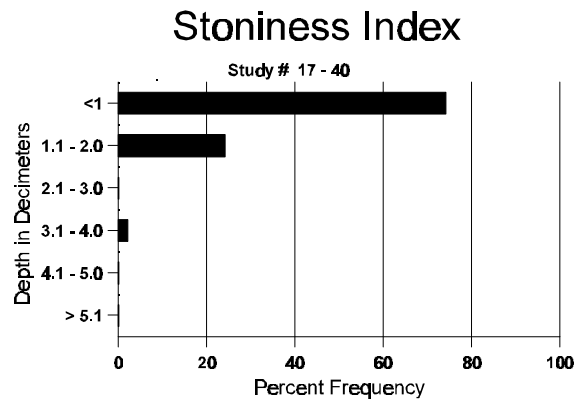
Herd unit 17 , Study no: 40

Cover Type	Nested Frequency '97	Average Cover %		
		'83	'89	'97
Vegetation	383	.50	7.25	48.81
Rock	259	25.50	24.00	17.10
Pavement	141	1.50	4.25	2.41
Litter	394	64.25	59.00	49.95
Cryptogams	150	1.00	1.00	3.50
Bare Ground	94	7.25	4.50	1.49

SOIL ANALYSIS DATA --

Herd Unit 17, Study no: 40

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.7	49.2 (14.3)	7.2	51.4	26.7	21.8	2.8	10.6	166.4	.7



PELLET GROUP FREQUENCY --

Herd unit 17 , Study no: 40

Type	Quadrat Frequency '97
Elk	63
Deer	32

BROWSE CHARACTERISTICS --

Herd unit 17 , Study no: 40

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata tridentata																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	2	-	-	-	-	-	2	-	-	-	40		2	
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	97	15	2	-	-	-	-	-	-	-	17	-	-	-	340	34	42	
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	3	1	-	-	-	-	-	-	-	2	-	-	2	80		4	
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	140		7	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>						<u>%Change</u>				
'83		00%			00%			00%						None				
'89		00%			00%			00%						Appeared				
'97		13%			00%			09%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	0%			
												'89	0		0%			
												'97	460		17%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata vaseyana																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	8	-	-	-	-	-	-	-	-	8	-	-	-	533		8	
	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
Y	83	35	-	-	-	-	-	-	-	-	35	-	-	-	2333		35	
	89	28	1	-	-	-	-	-	-	-	29	-	-	-	1933		29	
	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	83	18	8	-	-	-	-	-	-	-	26	-	-	-	1733	26	15	
	89	27	-	-	2	-	-	-	-	-	27	-	2	-	1933	23	18	
	97	13	24	-	-	-	-	-	-	-	37	-	-	-	740	26	42	
D	83	2	3	3	-	-	-	-	-	-	8	-	-	-	533		8	
	89	8	3	2	-	-	-	-	-	-	11	2	-	-	866		13	
	97	1	2	-	-	-	-	-	-	-	3	-	-	-	60		3	
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		16%			04%			00%			+ 3%							
'89		06%			03%			03%			-81%							
'97		59%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	4599	Dec:	12%			
												'89	4732		18%			
												'97	880		7%			
Atriplex canescens																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	97	-	-	9	-	-	-	-	-	-	9	-	-	-	180	31	33	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%			None							
'89		00%			00%			00%			Appeared							
'97		00%			90%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	-			
												'89	0		-			
												'97	200		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Chrysothamnus nauseosus albicaulis																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	15	-	-	-	-	-	-	-	-	4	-	-	-	300		15	
M	83	10	-	-	-	-	-	-	-	-	10	-	-	-	666	25	21	
	89	6	-	-	-	-	-	-	-	-	6	-	-	-	400	27	31	
	97	105	18	5	-	1	-	-	-	-	31	-	1	-	2580	34	35	
D	83	13	-	-	-	-	-	-	-	-	13	-	-	-	866		13	
	89	8	1	-	-	-	-	-	-	-	8	-	1	-	600		9	
	97	2	-	4	-	-	-	-	-	1	2	-	-	5	140		7	
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	160		8	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%			-35%							
'89		07%			00%			07%			+67%							
'97		13%			07%			04%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	1532	Dec:	57%			
												'89	1000		60%			
												'97	3020		5%			
Chrysothamnus viscidiflorus viscidiflorus																		
M	83	3	-	-	-	-	-	-	-	-	3	-	-	-	200	20	26	
	89	3	-	-	-	-	-	-	-	-	3	-	-	-	200	13	14	
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	14	19	
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	3	-	-	-	-	-	-	-	-	2	-	1	-	200		3	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%			+50%							
'89		00%			00%			17%			-95%							
'97		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	200	Dec:	0%			
												'89	400		50%			
												'97	20		0%			

Age Group	YGR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Gutierrezia sarothrae																		
Seedling	'83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'97	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
Young	'83	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	'89	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6	
	'97	104	-	-	-	-	-	-	-	-	104	-	-	-	2080		104	
Mature	'83	44	-	-	-	-	-	-	-	-	44	-	-	-	2933	13	9	
	'89	67	-	-	-	-	-	-	-	-	67	-	-	-	4466	13	13	
	'97	82	-	-	-	-	-	-	-	-	82	-	-	-	1640	11	10	
Dead	'83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'89	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	'97	6	-	-	-	-	-	-	-	-	5	-	-	1	120		6	
Extra	'83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'97	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'83			00%			00%			+40%							
		'89			00%			00%			-23%							
		'97			00%			00%			.52%							
Total Plants/Acre (excluding Dead & Seedlings)												'83	2999	Dec:	0%			
												'89	4999		3%			
												'97	3840		3%			
Opuntia spp.																		
Young	'83	4	-	-	-	-	-	-	-	-	2	-	2	-	266		4	
	'89	8	-	-	-	-	-	-	-	-	8	-	-	-	533		8	
	'97	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Mature	'83	7	-	-	-	-	-	-	-	-	5	-	2	-	466	6	10	
	'89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	'97	7	-	-	-	-	-	-	-	-	7	-	-	-	140	7	10	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'83			00%			00%			-27%							
		'89			00%			00%			-66%							
		'97			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	732	Dec:	-			
												'89	533		-			
												'97	180		-			